

thinner than the gate line region thickness;
a number of anodes located in columns orthogonal to and opposing the rows of cathodes, wherein the anodes include multiple phosphors, and wherein the intersection of the rows and columns form pixels; and
a row decoder and a column decoder each coupled to the field emitter array in order to selectively access the pixels; and
a processor adapted to receiving input signals and providing the input signals to the row and column decoders.

REMARKS

Applicant has carefully reviewed and considered the Office Action mailed on August 15, 2001, and the references cited therewith.

Claims 43, 47, 51-53, and 57 are amended, no claims are canceled, and no claims are added; as a result, claims 36-60 are now pending in this application.

Claim Objection

Claim 43 was objected to for having two periods. Claim 43 has been amended to remove the typographical error.

§ 112 Rejection of the Claims

Claims 47-60 were rejected under 35 USC § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

Independent claims 47, 51-53, and 57 have been amended to more particularly point out and distinctly claim the subject matter which Applicant regards as the invention. The word "gate" has been amended to read "gate line." The amendments to these claims is typographical in nature, and no new matter has been added.

Reconsideration and withdrawal of the 35 USC § 112, second paragraph rejection is respectfully requested with respect to claims 47-60.

§103 Rejection of the Claims

Claims 36-60 were rejected under 35 USC § 103(a) as being unpatentable over Cloud et al. (U.S. Patent No. 5,653,619).

Method limitations carry patentable weight in a product-by-process claim

Applicant submits that the method limitations must be given patentable weight insofar as the method described defines a product feature of an end result that is patentable. MPEP 2113 begins by stating that, "product-by-process claims are not limited to the manipulations of the recited steps, only the structure implied by the steps." Applicant respectfully submits that while claims are not limited to the manipulations of the recited steps, the recited steps also cannot be ignored. The intent of product-by-process claims is that they define a structure implied by the steps. When the recited steps define a patentable structure implied by the steps, the method limitations must be given patentable weight.

Applicant's independent claim 36 includes a process where forming the gate insulator layer includes ion etching the insulator layer such that the insulator layer is formed thinner around the emitter tips than in an isolation region of the substrate. One structure in the resulting product implied by this operation is that a distance separating the number of cathode emitter tips from the number of gate lines is significantly thinner than a separation distance separating the number of gate lines and the substrate. Applicant submits that this structure is novel over Cloud and carries patentable weight.

The drawings of Cloud must be interpreted in light of the specification

Regarding the Cloud reference, the rejection states:

Cloud et al. further disclose that a distance separating the number of cathode emitter tips from the number of gate lines is significantly thinner than a separation distance separating the number of gate lines and the substrate (see Fig 1, Fig 2, and Fig 2B).

Applicant respectfully submits that the pending Office Action incorrectly relies heavily on a superficial appearance of Figures 1, 2, 2A and 2B in Cloud. Applicant submits that the drawings must be interpreted in light of the specification. Pursuant to MPEP 2125 "proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale."

MPEP 2125 goes on to state that “**when the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurements are of little value.** However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonable teach one of ordinary skill in the art.”

The Cloud reference does not appear to indicate that the drawings are to scale, and the Cloud reference appears to be silent as to dimensions. Therefore, Applicant submits that the superficial appearance alone of Figures 1, 2, 2A and 2B does not support a 103(a) rejection in this matter.

The specification of Cloud does not include all elements of Applicant's claims and Cloud teaches away from Applicant's invention

As stated in MPEP 2125, “the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonable teach one of ordinary skill in the art.” The specification of the Cloud reference appears to discuss a careful process of choosing a uniform thickness for the **conformal** insulating layer in column 5, lines 42-50.

The thickness of this first insulating layer 18 will substantially determine **both** the gate 15 to cathode 13 spacing, **as well as** the gate 15 to substrate spacing 11. Hence, the insulating layer 18 must be as thin as possible, since small gate 15 to cathode 13 distances result in lower emitter drive voltages, **at the same time**, the insulating layer 18 must be large enough to prevent the oxide breakdown which occurs if the gate is not adequately spaced from the cathode conductor 12.

Cloud **does not teach variations in thickness** of the insulating layer 18. It merely teaches that the single uniform thickness chosen must be chosen with certain performance factors in mind as discussed in the Cloud quotation above. In fact, Cloud teaches away from varying the thickness of the insulating layer 18 as cited by the Examiner when Cloud states that the insulating layer is **preferably conformal** (col. 5, line 62).

A gate layer 15 appears to be deposited over the preferably conformal insulating layer 18. Because the preferably conformal insulating layer is uniform in thickness, and no material has been removed from the insulating layer, the distance separating the gate lines from the substrate is equal to the uniform thickness of the insulating layer. Because the thickness of the insulating layer is uniform, it is impossible for any portion of the gate layer 15 to be closer to the cathode

13 than the distance separating the gate lines from the substrate.

Response to Examiner's interpretation of Cloud

On page 8 of the pending Office Action, reference is made to a portion of the specification of Cloud. However, the citation (col. 5, lines 52-55) appears to have been misunderstood. The rejection states:

Cloud teaches that the insulating layer 18 can be deposited to a level substantially equal to or slightly higher than the level of the cathode tips (Lines 52-55 of column 5). In the case, when it is deposited at the level of cathode tip, thickness of the insulating layer 18 above the cathode tip is zero while the thickness of the insulating layer at other locations has a definite value.

A conformal layer as specifically taught by Cloud, by definition, does not vary in thickness. The misunderstanding of Cloud in the pending Office Action appears to arise where Cloud refers to depositing the insulating layer 18 to a level in comparison to the cathode emitter 13. Cloud refers to a level of the cathode emitter 13. One skilled in the art will recognize this as a distance between the base of the cathode emitter 13 and the tip of the cathode emitter. Cloud also refers to a level of the insulating layer 18. One skilled in the art will recognize this as a thickness of the conformal insulating layer 18 in a region spaced apart from the cathode emitter 13. When Cloud describes depositing the insulating layer 18 to a level equal to the level of the cathode emitter 13, the insulating layer level referred to is understood to be an average of the regions that are spaced apart from the emitter tip 13 itself. In the local region of the cathode emitter, one skilled in the art will recognize that the conformal insulating layer 18 maintains its thickness as it "conforms to the shape of the cathode emitter tip 13" (col. 5, line 64).

Applicant is unable to understand how the word "conformal" as specifically taught in Cloud (col. 5, lines 62 and 64) can be used to describe the proposed interpretation with varied layer thicknesses as hypothesized in Examiner's paragraph 1 on page 8 of the pending Office Action.

In contrast, Applicant's invention includes a field emitter array where the distance separating the number of cathode emitter tips from the number of gates lines is significantly thinner than a separation distance separating the number of gate lines and the substrate.

Because the Figures 1, 2, 2A and 2B of Cloud cited in the pending Office Action do not appear to be designated as being to scale, and no dimensions appear to be included, the Figures alone do not support a 35 USC § 103(a) rejection. When interpreted in light of the specification of Cloud, a conformal insulator layer is shown. The conformal insulator layer makes it impossible for Cloud to show a distance separating the number of cathode emitter tips from the number of gates lines that is significantly thinner than a separation distance separating the number of gate lines and the substrate. Reconsideration and withdrawal of Examiner's 35 USC § 103(a) rejection is respectfully requested.

CONCLUSION

Applicant respectfully submits that the claims are in condition for allowance and notification to that effect is earnestly requested. The Examiner is invited to telephone Applicant's attorney at (612) 373-6944 to facilitate prosecution of this application.

If necessary, please charge any additional fees or credit overpayment to Deposit Account No. 19-0743.

Respectfully submitted,

JI UNG LEE

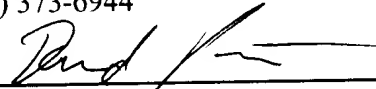
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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 15 day of November, 2001.

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